

Preliminary Amendment

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Serial No. Unknown (Parent Serial No. 09/065,944)

Filed: Herewith (Parent: April 24, 1998)

Title: METHODS FOR USE IN PACKAGING APPLICATIONS USING AN ADHESIVE COMPOSITION (As Amended)

In the Claims

Please cancel claims 15-21 and 65-82 as indicated in the Request for Filing a Divisional Application filed herewith. Please amend claims 1, 22, 31-34, 43-45, 49, 59-60, and 62 as follows. Therefore claims 1-14 and 22-64 are pending in the present application. All the pending claims are reproduced herein for convenience with the amended claims so marked.

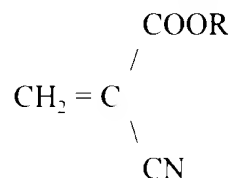
1. (Once Amended) A method for applying an adhesive to a wafer comprising:
 providing a wafer having a surface; and
 applying an instant setting adhesive composition on the surface of the wafer in a configuration wherein a plurality of portions of the surface have the instant setting adhesive composition applied thereon, and further wherein one or more zones of the surface[t] are essentially free of the instant setting adhesive composition.
2. The method of claim 1 further comprising singulating the wafer to form at least one die having the instant setting adhesive composition on at least a portion thereof.
3. The method of claim 2 wherein the zones comprise singulation streets.
4. The method of claim 1 wherein the zones comprise regions having exposed bond pads.
5. The method of claim 1 wherein applying the instant setting adhesive composition to the surface of the wafer comprises a technique selected from the group of screen printing, depositing and patterning, syringe applying, stenciling, dip coating, spraying, dot shooting, and combinations thereof.

6. The method of claim 1 wherein the instant setting adhesive comprises an adhesive component selected from the group of a cyanoacrylate adhesive, an anaerobic acrylic adhesive, and mixtures thereof.

7. The method of claim 1 further comprising applying an adhesion promoter to the surface of the wafer prior to applying the instant setting adhesive composition.

8. The method of claim 1 wherein the instant setting adhesive composition comprises at least one optional additive selected from the group of a thermal stabilizer, a thickener, a plasticizer, a toughener, a conductive filler, a dielectric additive, a moisture stabilizer, a curing inhibitor, an adhesion promoter, a storage stabilizer, a colorant, and an organic solvent.

9. The method of claim 1 wherein the instant setting adhesive composition comprises a cyanoacrylic adhesive component comprising a monomer of the formula:



wherein R is selected from the group of a C₁₋₆ alkyl, a cycloalkyl, an alkenyl, an alkynyl, a cycloalkenyl, an alkaryl, an aralkyl, and an aryl group.

10. The method of claim 8 wherein R is selected from the group of a methyl group, an ethyl group, an n-propyl group, an isopropyl group, an n-butyl group, an isobutyl group, a pentyl group, a hexyl group, an allyl group, a methallyl group, a crotyl group, a propargyl group, a cyclohexyl group, a benzyl group, a phenyl group, a cresyl group, a 2-chlorobutyl group, a trifluoroethyl group, a 2-methoxyethyl group, a 3-methoxybutyl group and a 2-ethoxyethyl group.

11. A method for applying an adhesive to a wafer comprising:
providing a wafer having a surface;
applying an instant setting adhesive composition on the surface of the wafer in a configuration wherein a plurality of portions of the surface have the instant setting adhesive composition dispensed thereon and one or more zones that are essentially free of the instant setting adhesive composition, wherein the instant setting adhesive composition has a thixotropic index from about 4 to about 6.

12. The method of claim 11 wherein applying the instant setting adhesive composition comprises one of stenciling and screen printing.

13. The method of claim 11 wherein the instant setting adhesive comprises an adhesive component selected from the group of a cyanoacrylate adhesive, an anaerobic acrylic adhesive, and mixtures thereof.

14. The method of claim 11 wherein the one or more zones include singulation streets and regions having exposed bond pads and further comprising singulating the wafer along the singulation streets to form at least one die having the instant setting adhesive coated on at least a portion thereof.

22. (Once Amended) A method for use in packaging a die comprising:
providing a die;
providing a leadframe; and
using an instant setting adhesive composition to attach the [one or more dice] die to a portion of the leadframe, wherein the instant setting adhesive composition comprises an adhesive component selected from the group of a cyanoacrylate adhesive, an anaerobic acrylic

adhesive, and mixtures thereof and further wherein the instant setting adhesive composition has a thixotropic index from about 4 to about 6.

23. The method of claim 22 wherein the die includes the instant setting adhesive composition applied thereon.

24. The method of claim 22 wherein the leadframe includes the instant setting adhesive composition applied on at least a portion thereof.

25. The method of claim 24 wherein the die includes the instant setting adhesive composition applied on a back surface of the die.

26. The method of claim 25 wherein the die includes the instant setting adhesive composition applied on at least a portion of a face surface of the die.

27. The method of claim 26 wherein the face surface of the die comprises exposed die bond pads.

28. The method of claim 22 further comprising using an instant setting adhesive composition comprising a conductive filler to form a heat sink; and attaching the heat sink to a portion of the die or the leadframe.

29. The method of claim 28 wherein the method further comprises assembling a package including the die and the leadframe, wherein the heat sink is attached to the package.

30. The method of claim 22 wherein the method further comprises applying an encapsulant on portions of the die attached to the leadframe, wherein the encapsulant comprises an instant setting adhesive composition.

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31. (Once Amended) The method of claim 22 wherein [the step of] using the instant setting adhesive composition comprises attaching a plurality of lead fingers of the leadframe to the die, wherein the lead fingers include the instant setting adhesive composition applied on at least a portion thereof.

32. (Once Amended) The method of claim 22 wherein [the step of] using the instant setting adhesive composition comprises attaching the die to a mounting paddle, wherein the mounting paddle includes the instant setting adhesive composition applied on at least a portion thereof.

33. (Once Amended) The method of claim 22 wherein [the step of] using the instant setting adhesive composition comprises using a technique selected from the group of screen printing, depositing and patterning, syringe applying, stenciling, dip coating, spraying, dot shooting, and combinations thereof to apply the instant setting adhesive composition.

34. (Once Amended) A method for use in packaging a die comprising:
providing a die;
providing a leadframe; and
using an instant setting adhesive composition to attach the [one or more dice] die to a portion of the leadframe under pressure and a temperature of about 200°C or less.

35. The method of claim 34 wherein the die includes the instant setting adhesive composition applied thereon.

36. The method of claim 34 wherein the leadframe includes the instant setting adhesive composition applied on at least a portion thereof.

37. The method of claim 36 wherein the die includes the instant setting adhesive composition applied on a back surface of the die.

38. The method of claim 34 wherein the die includes the instant setting adhesive composition applied on at least a portion of a face surface of the die.

39. The method of claim 38 wherein the face surface of the die comprises exposed die bond pads.

40. The method of claim 34 further comprising using an instant setting adhesive composition comprising a conductive filler to form a heat sink; and attaching the heat sink to a portion of the die or the leadframe.

41. The method of claim 40 wherein the method further comprises assembling a package including the die and the leadframe, wherein the heat sink is attached to the package.

42. The method of claim 34 wherein the method further comprises applying an encapsulant on portions of the die attached to the leadframe, wherein the encapsulant comprises an instant setting adhesive composition.

43. (Once Amended) The method of claim 34 wherein [the step of] using the instant setting adhesive composition comprises attaching a plurality of lead fingers of the leadframe to the die, wherein the lead fingers include the instant setting adhesive composition applied on at least a portion thereof.

44. (Once Amended) The method of claim 34 wherein [the step of] using the instant setting adhesive composition comprises attaching the die to a mounting paddle, wherein the

mounting paddle includes the instant setting adhesive composition applied on at least a portion thereof.

45. (Once Amended) The method of claim 34 wherein [the step of] using the instant setting adhesive composition comprises using a technique selected from the group of screen printing, depositing and patterning, syringe applying, stenciling, dip coating, spraying, dot shooting, and combinations thereof to apply the instant setting adhesive composition.

46. A method for attaching a semiconductor die to a leadframe comprising:
providing an instant setting adhesive composition including an adhesive component selected from the group of a cyanoacrylate adhesive, an anaerobic acrylic adhesive, and mixtures thereof;

applying the instant setting adhesive composition on at least a portion of a wafer including a plurality of dice; and

singulating dice from the wafer; and

attaching a die having the instant setting adhesive composition applied on at least a portion thereof to a portion of a leadframe.

47. The method of claim 46 wherein the portion of the leadframe comprises a mounting paddle and the surface of the wafer comprises a back surface of the wafer.

48. The method of claim 46 wherein applying the instant setting adhesive composition comprises applying the instant setting adhesive composition in a pattern on the wafer, the pattern including the instant setting adhesive composition on regions of the wafer such that singulation streets and bond pads being essentially free of the instant setting adhesive composition.

49. (Once Amended) The method of claim 46 wherein attaching the die on a portion of the leadframe comprises [the steps of]:

positioning a portion of the die having the instant setting adhesive composition thereon adjacent to the portion of the leadframe; and

applying pressure at an elevated temperature to attach the die to the leadframe.

50. The method of claim 49 wherein the elevated temperature is about 200°C or less.

51. The method of claim 46 wherein the portion of the leadframe comprises one or more lead fingers of a lead on chip leadframe and the surface of the wafer comprises a face surface of the wafer.

52. The method of claim 46 wherein the portion of the leadframe comprises one or more lead fingers and the surface of the wafer comprises a back surface of the wafer.

53. A method for attaching a semiconductor die to a leadframe:
dispensing an instant setting adhesive composition on the leadframe, the instant setting adhesive composition comprising an adhesive component selected from the group of a cyanoacrylate adhesive, an anaerobic acrylic adhesive, and mixtures thereof;

placing the die in contact with the instant setting adhesive composition; and

forming a bond between the die and the leadframe with the instant setting adhesive composition.

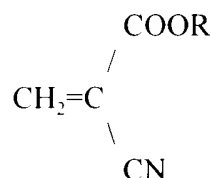
54. The method of claim 53 further comprising applying a catalyst to the leadframe, die or to the instant setting adhesive composition prior to forming the bond between the die and the leadframe.

55. The method of claim 53 wherein the leadframe includes a mounting paddle.

56. The method of claim 53 wherein the leadframe comprises a lead-on-chip leadframe.

57. A method for attaching a semiconductor die to a leadframe:
providing the leadframe with a mounting paddle;
dispensing an instant setting adhesive composition on the mounting paddle;
placing a die in contact with the instant setting adhesive composition; and
applying pressure at a temperature of about 200°C or less to bond the die to the leadframe with the instant setting adhesive composition.

58. The method of claim 57 wherein the instant setting adhesive composition comprises a cyanoacrylate adhesive component with a formula:



wherein R is selected from the group of a C₁₋₆ alkyl, a cycloalkyl, an alkenyl, an alkynyl, a cycloalkenyl, an alkaryl, an aralkyl, and an aryl group.

59. (Once Amended) The method of claim 57 wherein [the dispensing step] dispensing the instant setting adhesive composition comprises a method selected from the group consisting of screen printing, depositing and patterning, syringe applying, stenciling, dip coating, spraying, dot shooting, and combinations thereof.

60. (Once Amended) The method of claim 57 wherein dispensing the [adhesive material] instant setting adhesive composition comprises forming a pattern of dots.

61. The method of claim 57 further comprising adding at least one optional additive selected from the group of a thermal stabilizer, a thickener, a plasticizer, a toughener, a conductive filler, a dielectric additive, a moisture stabilizer, a curing inhibitor, an adhesion promoter, a storage stabilizer, a colorant, and an organic solvent.

62. (Once Amended) A method for attaching a lead-on-chip semiconductor die to a lead-on-chip leadframe:

providing the leadframe with a plurality of lead fingers configured to form a die mounting area;

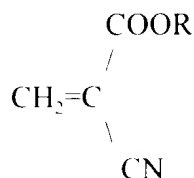
dispensing an instant setting adhesive composition on the lead fingers in the die mounting area, said [adhesive material] instant setting adhesive composition comprising an adhesive component selected from the group of a cyanoacrylate adhesive, an anaerobic acrylic adhesive, and mixtures thereof and an electrically insulating filler;

placing the die in contact with the instant setting adhesive composition; and

forming a bond between the die and the lead fingers with the instant setting adhesive composition.

63. The method of claim 62 further comprising applying a catalyst to the lead fingers, die or the instant setting adhesive composition prior to the placing step.

64. The method of claim 62 wherein the cyanoacrylate adhesive comprises a monomer with a formula:



wherein R is selected from the group of a C₁₋₆ alkyl, a cycloalkyl, an alkenyl, an alkynyl, a cycloalkenyl, an alkaryl, an aralkyl, and an aryl group.